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EXAMINER	
HALL, ASHA J	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/743,683	KONOLD ET AL.	
	Examiner	Art Unit	
	Asha Hall	1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 July 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,9 and 17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,9 and 17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *December 20, 2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The applicant fails to disclose in the specification "whereby a collector panel positional/orientation adjustment capability is provided to allow minor adjustments of the solar panel to clear roof obstructions" as stated in the amended claim 1(a).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Konold (US Patent 6,630,622 B2) in view of Zickell et al. (US Pre-Grant Patent Publication 2002061379), McDonough et al. (US Patent 6,606,823), Marek (US Patent 6,820,439

B1), Nolin et al. (US Patent 3,647,252), Ort (US Patent 4,372,292), Grzybowski et al. (US Patent 5,340,391), Pfeffer (US Patent 4,250,221), Corbett et al. (US Patent 5,799,986), Ewer et al. (US Patent 6,938,337), and Kirby (US Patent 3,824,552).

The first paragraph in claim 1 is interpreted as admitted prior art. The limitations that follow (i.e., limitations 1(a) – 1(g)) describe the instant invention as an improvement over that prior art. As such, all of the features in the first paragraphs of these claims read on a published invention disclosed by Konold. Konold discloses a solar collector panel (100, Figure 1) for thermal radiant cooling and for simultaneously converting solar energy to electrical power and thermal energy (column 1, lines 29-31) comprising: a rectangular frame (407, Figure 4) with an open top side (i.e., the side facing the Fresnel Lens, 409, in Figure 4) and a bottom side closed by a bottom plate (bottom cover plate, 405); a photovoltaic grid for converting solar energy transmitted into the collector into electrical energy (PV Grid, 401, Figure 4); a thermal collecting/radiator sheet (copper plate, 403, Figure 4), located on a plane below the photovoltaic grid (as shown in Figure 4), for converting solar energy transmitted into the collector into thermal energy; a copper tubing heat exchanger containing a plurality of interconnected heat collecting copper tubes disposed on a plane below the thermal collecting/radiator sheet (copper tubing heat exchanger, 404, Figure 4) but conductively coupled to the sheet through a thermally conductive material that collects thermal energy from the sheet and imparts that thermal energy in a fluid disposed within the heat collecting copper tubes (as described in column 2, lines 20-25). Though the bottom plate of Konold is constructed of copper, one with skill in the art would have replaced it with any number of metals with

high thermal conductivity including aluminum. Also Konold discloses a temperature sensor (806)(col.2; lines: 55-61) attached to the photovoltaic grid (201) and (401) with a signaling cable as shown in Figure 8 (col.5; lines: 43-54). However, Konold fails to disclose several features of the claim that pertain to the roof attachment. These will be treated in succession below. Konold fails to disclose a first waterproof, self-sealing, membrane with a top surface and an opposed bottom surface.

Zickell et al. disclose the use of a roofing membrane material made of a fibrous mat (paragraph 0012, first sentence) in order to provide traction, structural integrity and lap sealing capabilities (paragraph 0012) and waterproofing (abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the roofing membrane of Zickell to any layer of a roof-installed panel collector or to the roof portion to which it is attached in order to provide sealing capabilities. This includes providing the roofing membrane of Zickell et al. to the bottom of the solar collector panel of Konold in order to affix the latter to the roof and simultaneously provide traction, structural integrity and lap sealing capabilities. Further, Zickell et al. teaches that the membrane may contain a first adhesive layer (adhesive surface provided by an adhesive rubberized asphalt layer, paragraph 0012) on its top surface. One of ordinary skill in the art would use this layer to adhesively secure to the bottom plate of solar collector of Konold in order to provide waterproofing.

As to limitations 1, Konold discloses the context of limitations 1 above, but fails to provide solenoid/control valves and sprinkler head units connected between rows of

panels that receive on/off control signals through their connected wiring to facilitate roof cooling capability.

McDonough et al. teach the use of a sprinkler system (sprinkler system, 30 and 31, Figure 4) with sprinkler head units connected between rows of panels to provide additional cooling for the building (Column 2, lines 5-7). It would have been obvious to one skilled in the art at the time of the invention to provide the sprinkler system of McDonough et al. to the modified device of Konold in order to provide additional cooling for the building. McDonough et al., however, fail to disclose that the valves in their sprinkler system are electrically activated solenoid valves.

Marek teaches a water delivery system whose purpose is to cool a building or structure (Figures 1 and 3). As part of said system, Marek teaches the use of a solenoid/control valve (38) controlled through "electronic actuation" (Column 5, line 3) to regulate the flow of water in said system. It would have been obvious to one skilled in the art at the time of the invention to provide the sprinkler system of McDonough et al. with solenoid activated/control valves of Marek to the modified device of Konold in order to provide additional cooling for the building and to provide on/off control signals through the wiring connecting the valves in the usual manner (i.e., through "electronic actuation" as described in Marek, column 5, line 3).

The sprinkler system of Marek provided to the modified device of Konold contains "a sensor detecting an environmental condition, such as roof temperature or sheet wetting, may activate water flow by actuating a solenoid valve" (abstract). Marek describes this sensor (50) that detects temperature explicitly in Column 5 lines 55-65

and its placement in Figure 1. Further, Marek explicitly mentions the controller device (system controller, 54) responsible for sending the signal from the sensor to the solenoid/control valves. The signal from any such temperature sensor would necessarily be analog, unless it were deliberately converted to digital. Finally, although Marek does not teach the placement of such sensors on solar panels, he does teach the use of such sensors on locations of the roof "facing solar radiation" (Column 5, line 63). It would have been obvious to one skilled in the art at the time of the invention to provide these sensors the surfaces of all of the solar panels in the construction of Konold in order to detect an environmental condition, such as roof temperature or sheet wetting, and activate water flow by actuating a valve based on said detected environmental condition.

As to limitations 1(a), Konold discloses mounting screw holes that "allow the fastening of the collector panel frame to a footing" in the anodized aluminum frame (407) for the "fastening of the collector panel frame to a footing or building roof using standard bolts" (Column 4, lines 44-47). Konold discloses a collector panel /the Fresnel lens(solar concentrator) lens retainer imparts a curvature/orientation adjustment which is provided to allow minor adjustments/ability to capture solar radiation and magnify it onto the solar panel magnify the available insolation regardless of the Sun position/to clear roof obstructions providing a passive solar tracker capability (col.2; lines: 38-43). However, Konold fails to disclose is that the mounting screw holes contain guide tubes extending the entire depth of the collector panel from the top of the frame through the

aluminum bottom plate evenly disposed around each side of the collector frame for securing the panel to the embedment with fasteners.

Nolin et al. disclose such guide tubes (fructoconical portions, 12 and 14) as part of the guide for fasteners (Figure 5). Nolin et al. explain in Column 3, lines 37-41 that when said guide tubes are used with a fastener or screw (5) as shown in Figure 4 they serve "to guide and position the screws." It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the guide tubes of Nolin et al. inside the mounting screw holes of the solar collector panel of Konold in order to guide and position the screws. As to the limitation that these tubes run the entire depth of the collector panel from the top of the frame through the aluminum bottom plate, one of sufficient skill in the art would adjust the length of the tubes so that they provide sufficient guidance to said screws. Finally, one of skill in the art would position the mounting screw holes and their associated guide tubes as needed in order to secure the panel to the embedment using screws. This includes evenly disposing said holes and tubes around each side of the collector frame.

As to limitations 1(b), Konold also fails to disclose a separate insulated embedment component with capability for factory prefabrication and designed for installation with standard construction techniques.

Ort discloses an embedment or roof-mount for a solar panel in Figures 1 and 2 (solar collector, 20, mounted as shown and described in column 3, lines 10-20) and shows the various components in the cutaway of Figure 3. Ort further discloses the prefabrication of the solar collectors (col.6; lines: 27-29). Wherein, Ort teaches in

Column 1 lines 65-68 and Column 2 lines 1-5 that his embedment is designed to allow solid and tight construction that may be completed "on-site" with facilitates both heat exchange and installation efficiency. As shown in Figure 2, the embedment of Ort contains a bottom layer made from standard building construction material as used for roof or deck sheathing (roof component, 40) with a top surface and an opposed bottom surface as shown and a solid insulation board with a top surface (insulation layer, 56) and an opposed bottom surface as shown in Figure 2. The embedment of Ort further contains a subsequent insulation layer (dark, heat-absorbing mounting material, 60). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the embedment of Ort in order to the solar collector of Konold in order to allow solid and tight construction that may be completed "on-site" with facilitates both heat exchange and installation efficiency.

Ort does not explicitly disclose a separate waterproof, self-sealing, membrane between the bottom layer and the solid insulation board.

As discussed above, one of ordinary skill in the art would provide the membrane of Zickel et al. to the modified device of Konold between the bottom layer of the embedment of Ort (40) and the insulation board in order to affix the latter to the former and simultaneously provide traction, structural integrity and lap sealing capabilities (as Zickel teaches in paragraph 0012). As further described above, the membrane of Zickell et al. may contain an adhesive layer (adhesive surface provided by an adhesive rubberized asphalt layer, paragraph 0012) on its top surface to provide waterproofing

(abstract). One of ordinary skill in the art would use this layer to adhesively secure it to the building construction material top surface of Ort (40) and provide waterproofing.

Although Ort does disclose a second layer of insulation to provide thermal insulation (dark, heat-absorbing mounting material, 60) placed above the solid insulation board (56), Ort does not explicitly disclose a lap cement layer (second lap cement layer) (col.2; lines: 57-62) that is positioned between two layers of insulation (i.e., between the solid insulation board and the second layer of insulation).

Grzybowski et al. disclose the use of a cold-applied asphalt lap cement layer (cold-applied asphalt composition, abstract) to seal sections of a roof in a manner that requires minimal waste disposal (Column 3, lines 21-25). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the lap cement layer of Grzybowski et al. as needed in the modified device of Konold in order to seal sections of the embedment while simultaneously decreasing waste disposal. This includes providing said lap cement layer between the two layers of insulation (i.e., between the solid insulation board and the second layer of insulation) provided by Ort in order to in order to seal sections of the embedment while simultaneously decreasing waste disposal.

Ort fails to disclose that the second layer of insulation (dark, heat-absorbing mounting material, 60) is made of fiberglass and asphalt based sheathing.

Pfeffer discloses a fiberglass mat (Figure 1) for use construction. As Pfeffer explains in Column 4, lines 12-20, one of the best uses of this mat is in the manufacture of asphalt roofing which has the advantages of being fireproof (Column 4, line 17) and

using less asphalt than standard roofing (Column 4, lines 18-20). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide insulated asphalt roofing using fiberglass mat of Pfeffer as a replacement for the second layer of insulation in the embedment of Ort provided in the modified device of Konold in order to make the embedment fireproof while using less asphalt than standard roofing.

In regard to clam 1(c), the embedment provided by Ort in the modified device of Konold does not contain a lap cement layer (first lap cement layer) in contact with the second layer of insulation because Ort does not explicitly disclose such a layer.

As mentioned above, Grzybowski et al. teach the use of a lap cement layer (cold-applied asphalt composition, abstract) to seal sections of a roof in a manner that requires minimal waste disposal in Column 3, lines 21-25. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the lap cement layer of Grzybowski et al. as needed in the modified device of Konold in order to seal sections of the embedment while simultaneously decreasing waste disposal. This includes providing the lap cement layer of Grzybowski et al. between the second layer of insulation in the embedment provided by Ort and the adhesive layer of and roofing membrane of Zickell.

As to limitations 1(d), pipe/tubing in the fluid transmission system joined to the collector panels that is part of the solar collector system of Konold (col.5; lines: 55-58) and Ort further discloses the prefabrication of the solar collectors (col.6; lines: 27-29). However, Konold fails to disclose is the use of a fluid containing pipe with a plurality of outlets terminated in a quick disconnect fittings, whereby fluids are distributed to and

collected from solar panels connected to the outlets by quick disconnect fittings attached to each solar panel.

Corbett et al. teach the use of quick connect/disconnect fittings of a pipe/tube in a fluid and vapor transmission system (Column 1, lines 10-20) in order to allow rapid connection and disconnection from the pipe/tube in a fluid transmission system (Column 1, lines 57-63 & Column 3, lines 65-68). It would have been obvious to one skilled in the art at the time of the invention to use the quick disconnect fittings of Corbett et al. along with the copper tubing/pipe of Konold to attached to the liquid inlet and outlet of each panel. It would have also been obvious to one skilled in the art at the time of the invention to use the quick connect fittings of Corbett et al. along with the tubing/liquid containing pipe of Konold to provide pipe liquid connection manifolds for liquid distribution to and collection from panels arrays that are connected to the manifold by the copper quick connect fittings.

As to limitations 1(e), the combination of Konold, Ort, and Corbett discussed in the context of limitations 1(d) and further discloses the integration of solar panels interconnected in plurality of configurations to a power receiving apparatus (Figures 5 and 6) (col.6; lines: 22-30), Ort further discloses the prefabrication of the solar collectors (col.6; lines: 27-29), and Corbett discloses a water tight snap on fitting to protect against leakage (col.4; lines: 26-33), but fails to disclose enclosed wiring distribution scheme that includes a raceway with water tight quick disconnect snap on receptacles and plugs integrated within the raceway.

Ewer et al. disclose a plastic raceway (depicted in Figures 1 and 7) as a means to hold and manage electrical wires while keeping them hidden from view. It would have been obvious to one skilled in the art at the time of the invention to use plastic raceways of Ewer et al. along with the embedment provided by Ort and Corbett to the modified device of Konold in order to hold and manage electrical wires while keeping them hidden from view. Such a system of raceways would be used to receive all electrical wiring from each panel or series panel of Konold arranged in an array.

In addition to limitations 1(e), the combination of Konold, Ort, and Corbett is discussed in the context of limitations 1(d) above, but fails to provide quick-disconnect snap-on receptacles and plugs.

Kirby discloses an electrical connector assembly that uses a "snap-in connector concept" (Column 1, lines 10-12) in order to "provide a disconnect means for mounting" of a socket (Column 1, lines 24-27). It would have been obvious to one skilled in the art at the time of the invention to provide the electrical assembly of Kirby along with the embedment of Ort in order to provide electrical interconnection of panels with a "quick-connect and disconnect means for mounting." Further, one skilled in the art would provide the electrical assembly of Kirby along with the embedment of Ort to connect panels or series strings of panels of modified Konold to the raceway of Ewer et al. again in order to provide a "quick-connect and disconnect means for mounting."

As to limitations 1(f), the combination of Konold and Ort discussed in the context of limitations 1(d) above, and Konold further discloses a storage tank for water storage (801), liquid pressurization, check valves (803), filter (806), (col.6; lines: 43-55) and

connectionfittings/conduit elbow fitting (402) as shown in Figure 8. Konold further discloses tubes/piping (col.1; lines: 54-60) and connection to connect to the apparatus to a building water distribution system (col.3; lines: 60-65). However, Konold fails to disclose a rain runoff collection trough connected to the lowest end of a slanted roof mounted solar panel or array of solar panels.

McDonough et al. disclose a modular roof covering system (Figures 1 – 4) that can manage store water runoff and collect and utilize solar energy (column 1, lines 39-45). McDonough et al. comprise teaches a rain runoff collection trough (troughs and ridges, 11 and 12, shown in Figure 1) to prevent saturation damage to the roof layers below from the weight of accumulated water (Column 4, lines 30-35). As McDonough et al. further explain in column 4, lines 24-27, the ridges (12) may have depressions (18) with holes (14) to allow excess water to drain out of the tray. It would have been obvious to one skilled in the art at the time of the invention to provide the rain runoff collection trough of McDonough et al. to the embedment of Ort provided to the modified device of Konold in order to prevent saturation damage to the roof layers below from the weight of accumulated water.

With respect to claim 1(g), Konold discloses in Figure 2 an improve heat exchanger consisting of copper tubing with copper liquid storage tank/water tank (col. 3; lines: 59-64). As for aluminum tubing with an aluminum water tank, the two materials are functional and mechanical equivalents. *Smith v. Hayashi*, 209 USPQ 754 (Bd. of Pat. Inter. 1980) (see MPEP 2144.06).

As detailed above, the combination of Konold and Zickell et al., Nolin et al., Ort, Grzybowski et al., Pfeffer, Corbett et al., Ewer et al., Kirby, McDonough et al., and Marek reads on the invention of claim 1.

5. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Konold (US Patent 6,630,622 B2) in view of Niwa (US Patent 5,420,043), Zickell et al. (US Pre-Grant Patent Publication 2002061379), McDonough et al. (US Patent 6,606,823), Marek (US Patent 6,820,439 B1), Nolin et al. (US Patent 3,647,252), Ort (US Patent 4,372,292), Grzybowski et al. (US Patent 5,340,391), Pfeffer (US Patent 4,250,221), Corbett et al. (US Patent 5,799,986), Ewer et al. (US Patent 6,938,337), and Kirby (US Patent 3,824,552).

The limitations that follow (i.e., limitations 9(a) – 9(g)) describe the instant invention as an improvement over that prior art. As such, all of the features in the first paragraphs of these claims read on a published invention disclosed by Konold. Konold discloses a solar collector panel (100, Figure 1) for thermal radiant cooling and for simultaneously converting solar energy to electrical power and thermal energy (column 1, lines 29-31) comprising: a rectangular frame (407, Figure 4) with an open top side (i.e., the side facing the Fresnel Lens, 409, in Figure 4) and a bottom side closed by a bottom plate (bottom cover plate, 405); a photovoltaic grid for converting solar energy transmitted into the collector into electrical energy (PV Grid, 401, Figure 4); a thermal collecting/radiator sheet (copper plate, 403, Figure 4), located on a plane below the photovoltaic grid (as shown in Figure 4), for converting solar energy transmitted into the collector into thermal energy; a copper tubing heat exchanger containing a plurality of

interconnected heat collecting copper tubes disposed on a plane below the thermal collecting/radiator sheet (copper tubing heat exchanger, 404, Figure 4) but conductively coupled to the sheet through a thermally conductive material that collects thermal energy from the sheet and imparts that thermal energy in a fluid disposed within the heat collecting copper tubes (as described in column 2, lines 20-25). Though the bottom plate of Konold is constructed of copper, one with skill in the art would have replaced it with any number of metals with high thermal conductivity including aluminum. Also Konold discloses a temperature sensor (806)(col.2; lines: 55-61) attached to the photovoltaic grid (201) and (401) with a signaling cable as shown in Figure 8 (col.5; lines: 43-54). However, Konold fails to disclose several features of the claim that will be treated in succession below.

Konold fails to disclose is that the solar panes are composed of a "thin-film photovoltaic grid vacuum deposited on a clear vinyl substrate for converting solar energy transmitted into the collector into electrical energy."

Niwa discloses a thin film solar module (solar cell, 300, Figure 3) that is vacuum deposited onto a clear substrate (transparent substrate, 301). Niwa explains in Column 8, line 9 that a transparent substrate allows the cell to utilize light incident through the transparent substrate. As Niwa further explains in Column 9 lines 10-15, this substrate may be made from a number of materials including both polyvinyl chloride and polyvinylidene. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the thin film solar module of Niwa with its transparent vinyl-

based substrate in the solar collector panel of Konold in order to allow the cell to utilize light incident through the transparent substrate.

Zickell et al. disclose the use of a roofing membrane material made of a fibrous mat (paragraph 0012, first sentence) in order to provide traction, structural integrity and lap sealing capabilities (paragraph 0012) and waterproofing (abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the roofing membrane of Zickell to any layer of a roof-installed panel collector or to the roof portion to which it is attached in order to provide sealing capabilities. This includes providing the roofing membrane of Zickell et al. to the bottom of the solar collector panel of Konold in order to affix the latter to the roof and simultaneously provide traction, structural integrity and lap sealing capabilities. Further, Zickell et al. teaches that the membrane may contain a first adhesive layer (adhesive surface provided by an adhesive rubberized asphalt layer, paragraph 0012) on its top surface. One of ordinary skill in the art would use this layer to adhesively secure to the bottom plate of solar collector of Konold in order to provide waterproofing.

As to limitations 9, the modified solar collector of Konold discussed in the context of limitations 9 above, but fails to provide solenoid/control valves and sprinkler head units connected between rows of panels that receive on/off control signals through their connected wiring to facilitate roof cooling capability.

McDonough et al. teach the use of a sprinkler system (sprinkler system, 30 and 31, Figure 4) with sprinkler head units connected between rows of panels to provide additional cooling for the building (Column 2, lines 5-7). It would have been obvious to

one skilled in the art at the time of the invention to provide the sprinkler system of McDonough et al. to the modified solar collector of Konold in order to provide additional cooling for the building. McDonough et al., however, fail to disclose that the valves in their sprinkler system are electrically activated solenoid valves.

Marek teaches a water delivery system whose purpose is to cool a building or structure (Figures 1 and 3). As part of said system, Marek teaches the use of a solenoid/control valve (38) controlled through "electronic actuation" (Column 5, line 3) to regulate the flow of water in said system. It would have been obvious to one skilled in the art at the time of the invention to provide the sprinkler system of McDonough et al. with solenoid activated/control valves of Marek provided to the modified device of Konold in order to provide additional cooling for the building and to provide on/off control signals through the wiring connecting the valves in the usual manner (i.e., through "electronic actuation" as described in Marek, column 5, line 3).

The sprinkler system of Marek provided to the modified solar collector of Konold that is further provided to the modified device of Konold contains "a sensor detecting an environmental condition, such as roof temperature or sheet wetting, may activate water flow by actuating a solenoid valve" (abstract). Marek describes this sensor (50) that detects temperature explicitly in Column 5 lines 55-65 and its placement in Figure 1. Further, Marek explicitly mentions the controller device (system controller, 54) responsible for sending the signal from the sensor to the solenoid/control valves. The signal from any such temperature sensor would necessarily be analog, unless it were deliberately converted to digital. Finally, although Marek does not teach the placement

of such sensors on solar panels, he does teach the use of such sensors on locations of the roof "facing solar radiation" (Column 5, line 63). It would have been obvious to one skilled in the art at the time of the invention to provide these sensors the surfaces of all of the solar panels in the construction of modified Konold in order to detect an environmental condition, such as roof temperature or sheet wetting, and activate water flow by actuating a valve based on said detected environmental condition.

As to limitations 9(a), Konold discloses mounting screw holes that "allow the fastening of the collector panel frame to a footing" in the anodized aluminum frame (407) for the "fastening of the collector panel frame to a footing or building roof using standard bolts" (Column 4, lines 44-47). Konold discloses a collector panel /the Fresnel lens (solar concentrator) lens retainer imparts a curvature/orientation adjustment which is provided to allow minor adjustments/ability to capture solar radiation and magnify it onto the solar panel magnify the available insolation regardless of the Sun position/to clear roof obstructions providing a passive solar tracker capability (col.2; lines: 38-43). However, Konold fails to disclose is that the mounting screw holes contain guide tubes extending the entire depth of the collector panel from the top of the frame through the aluminum bottom plate evenly disposed around each side of the collector frame for securing the panel to the embedment with fasteners.

Nolin et al. disclose such guide tubes (fructoconical portions, 12 and 14) as part of the guide for fasteners (Figure 5). Nolin et al. explain in Column 3, lines 37-41 that when said guide tubes are used with a fastener or screw (5) as shown in Figure 4 they serve "to guide and position the screws." It would have been obvious to one of ordinary

skill in the art at the time of the invention to provide the guide tubes of Nolin et al. inside the mounting screw holes of the modified solar collector panel of Konold in order to guide and position the screws. As to the limitation that these tubes run the entire depth of the collector panel from the top of the frame through the aluminum bottom plate, one of sufficient skill in the art would adjust the length of the tubes so that they provide sufficient guidance to said screws. Finally, one of skill in the art would position the mounting screw holes and their associated guide tubes as needed in order to secure the panel to the embedment using screws. This includes evenly disposing said holes and tubes around each side of the collector frame.

As to limitations 9(b), modified Konold also fails to disclose a separate insulated embedment component with capability for factory prefabrication and designed for installation with standard construction techniques.

Ort discloses an embedment or roof-mount for a solar panel in Figures 1 and 2 (solar collector, 20, mounted as shown and described in column 3, lines 10-20) and shows the various components in the cutaway of Figure 3. Ort further discloses the prefabrication of the solar collectors (col.6; lines: 27-29). Wherein, Ort teaches in Column 1 lines 65-68 and Column 2 lines 1-5 that his embedment is designed to allow solid and tight construction that may be completed "on-site" with facilitates both heat exchange and installation efficiency. As shown in Figure 2, the embedment of Ort contains a bottom layer made from standard building construction material as used for roof or deck sheathing (roof component, 40) with a top surface and an opposed bottom surface as shown and a solid insulation board with a top surface (insulation layer, 56)

and an opposed bottom surface as shown in Figure 2. The embedment of Ort further contains a subsequent insulation layer (dark, heat-absorbing mounting material, 60). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the embedment of Ort in order to the solar collector of Konold in order to allow solid and tight construction that may be completed "on-site" with facilitates both heat exchange and installation efficiency.

Ort does not explicitly disclose a separate waterproof, self-sealing, membrane between the bottom layer and the solid insulation board.

As discussed above, one of ordinary skill in the art would provide the membrane of Zickel et al. to the modified device of Konold between the bottom layer of the embedment of Ort (40) and the insulation board in order to affix the latter to the former and simultaneously provide traction, structural integrity and lap sealing capabilities (as Zickel teaches in paragraph 0012). As further described above, the membrane of Zickell et al. may contain an adhesive layer (adhesive surface provided by an adhesive rubberized asphalt layer, paragraph 0012) on its top surface to provide waterproofing (abstract). One of ordinary skill in the art would use this layer to adhesively secure it to the building construction material top surface of Ort (40) and provide waterproofing.

Although Ort does disclose a second layer of insulation to provide thermal insulation (dark, heat-absorbing mounting material, 60) placed above the solid insulation board (56), Ort does not explicitly disclose a lap cement layer (second lap cement layer) (col.2; lines: 57-62) that is positioned between two layers of insulation (i.e., between the solid insulation board and the second layer of insulation).

Grzybowski et al. disclose the use of a cold-applied asphalt lap cement layer (cold-applied asphalt composition, abstract) to seal sections of a roof in a manner that requires minimal waste disposal (Column 3, lines 21-25). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the lap cement layer of Grzybowski et al. as needed in the modified device of Konold in order to seal sections of the embedment while simultaneously decreasing waste disposal. This includes providing said lap cement layer between the two layers of insulation (i.e., between the solid insulation board and the second layer of insulation) provided by Ort in order to in order to seal sections of the embedment while simultaneously decreasing waste disposal.

Ort fails to disclose that the second layer of insulation (dark, heat-absorbing mounting material, 60) is made of fiberglass and asphalt based sheathing.

Pfeffer discloses a fiberglass mat (Figure 1) for use construction. As Pfeffer explains in Column 4, lines 12-20, one of the best uses of this mat is in the manufacture of asphalt roofing which has the advantages of being fireproof (Column 4, line 17) and using less asphalt than standard roofing (Column 4, lines 18-20). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide insulated asphalt roofing using fiberglass mat of Pfeffer as a replacement for the second layer of insulation in the embedment of Ort provided in the modified device of Konold in order to make the embedment fireproof while using less asphalt than standard roofing.

In regard to clam 9(c), the embedment provided by Ort in the modified device of Konold does not contain a lap cement layer (first lap cement layer) in contact with the second layer of insulation because Ort does not explicitly disclose such a layer.

As mentioned above, Grzybowski et al. teach the use of a lap cement layer (cold-applied asphalt composition, abstract) to seal sections of a roof in a manner that requires minimal waste disposal in Column 3, lines 21-25. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the lap cement layer of Grzybowski et al. as needed in the modified device of Konold in order to seal sections of the embedment while simultaneously decreasing waste disposal. This includes providing the lap cement layer of Grzybowski et al. between the second layer of insulation in the embedment provided by Ort and the adhesive layer of and roofing membrane of Zickell.

As to limitations 9(d), pipe/tubing in the fluid transmission system joined to the collector panels that is part of the solar collector system of Konold (col.5; lines: 55-58) and Ort further discloses the prefabrication of the solar collectors (col.6; lines: 27-29). However, Konold fails to disclose is the use of a fluid containing pipe with a plurality of outlets terminated in a quick disconnect fittings, whereby fluids are distributed to and collected from solar panels connected to the outlets by quick disconnect fittings attached to each solar panel.

Corbett et al. teach the use of quick connect/disconnect fittings of a pipe/tube in a fluid and vapor transmission system (Column 1, lines 10-20) in order to allow rapid connection and disconnection from the pipe/tube in a fluid transmission system (Column

1, lines 57-63 & Column 3, lines 65-68). It would have been obvious to one skilled in the art at the time of the invention to use the quick disconnect fittings of Corbett et al. along with the copper tubing/pipe of Konold to attached to the liquid inlet and outlet of each panel. It would have also been obvious to one skilled in the art at the time of the invention to use the quick connect fittings of Corbett et al. along with the tubing/liquied containing pipe of Konold to provide pipe liquid connection manifolds for liquid distribution to and collection from panels arrays that are connected to the manifold by the copper quick connect fittings.

As to limitations 9(e), the combination of Konold, Ort, and Corbett discussed in the context of limitations 9(d) and further discloses the integration of solar panels interconnected in plurality of configurations to a power receiving apparatus (Figures 5 and 6) (col.6; lines: 22-30), Ort further discloses the prefabrication of the solar collectors (col.6; lines: 27-29), and Corbett discloses a water tight snap on fitting to protect against leakage (col.4; lines: 26-33), but fails to disclose enclosed wiring distribution scheme that includes a raceway with water tight quick disconnect snap on receptacles and plugs integrated within the raceway.

Ewer et al. disclose a plastic raceway (depicted in Figures 1 and 7) as a means to hold and manage electrical wires while keeping them hidden from view. It would have been obvious to one skilled in the art at the time of the invention to use plastic raceways of Ewer et al. along with the embedment provided by Ort and Corbett to the modified device of Konold in order to hold and manage electrical wires while keeping

them hidden from view. Such a system of raceways would be used to receive all electrical wiring from each panel or series panel of Konold arranged in an array.

Furthermore for limitations 9(e), the combination of Konold, Ort, and Corbett discussed in the context of limitations 9(d) above, but fails to provide quick-disconnect snap-on receptacles and plugs.

Kirby discloses an electrical connector assembly that uses a "snap-in connector concept" (Column 1, lines 10-12) in order to "provide a disconnect means for mounting" of a socket (Column 1, lines 24-27). It would have been obvious to one skilled in the art at the time of the invention to provide the electrical assembly of Kirby along with the embedment of Ort in order to provide electrical interconnection of panels with a "quick-connect and disconnect means for mounting." Further, one skilled in the art would provide the electrical assembly of Kirby along with the embedment of Ort to connect panels or series strings of panels of modified Konold to the raceway of Ewer et al. again in order to provide a "quick-connect and disconnect means for mounting."

As to limitations 9(f), the combination of Konold and Ort discussed in the context of limitations 9(d) above, and Konold further discloses a storage tank for water storage (801), liquid pressurization, check valves (803), filter (806), (col.6; lines: 43-55) and connectionfittings/conduit elbow fitting (402) as shown in Figure 8. Konold further discloses tubes/piping (col.1; lines: 54-60) and connection to connect to the apparatus to a building water distribution system (col.3; lines: 60-65).However, Konold fails to disclose a rain runoff collection trough connected to the lowest end of a slanted roof mounted solar panel or array of solar panels.

McDonough et al. disclose a modular roof covering system (Figures 1 – 4) that can manage store water runoff and collect and utilize solar energy (column 1, lines 39-45). McDonough et al. comprise teaches a rain runoff collection trough (troughs and ridges, 11 and 12, shown in Figure 1) to prevent saturation damage to the roof layers below from the weight of accumulated water (Column 4, lines 30-35). As McDonough et al. further explain in column 4, lines 24-27, the ridges (12) may have depressions (18) with holes (14) to allow excess water to drain out of the tray. It would have been obvious to one skilled in the art at the time of the invention to provide the rain runoff collection trough of McDonough et al. to the embedment of Ort provided to the modified device of Konold in order to prevent saturation damage to the roof layers below from the weight of accumulated water.

With respect to claim 9(g), Konold discloses in Figure 2 an improve heat exchanger consisting of copper tubing with copper liquid storage tank/water tank (col. 3; lines: 59-64). As for aluminum tubing with an aluminum water tank, the two materials are functional and mechanical equivalents. *Smith v. Hayashi*, 209 USPQ 754 (Bd. of Pat. Inter. 1980) (see MPEP 2144.06).

As detailed above, the combination of Konold and Zickell et al., Nolin et al., Ort, Grzybowski et al., Pfeffer, Corbett et al., Ewer et al., Kirby, McDonough et al., and Marek reads on the invention of claim 9.

6. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Konold (US Patent 6,630,622 B2) in view of Zickell et al. (US Pre-Grant Patent Publication 2002061379), McDonough et al. (US Patent 6,606,823), Marek (US Patent 6,820,439 B1), Nolin et al. (US Patent 3,647,252), Ort (US Patent 4,372,292), Grzybowski et al. (US Patent 5,340,391), Pfeffer (US Patent 4,250,221), Corbett et al. (US Patent 5,799,986), Ewer et al. (US Patent 6,938,337), and Kirby (US Patent 3,824,552).

The limitations that follow (i.e., limitations 17(a) – 17(g)) describe the instant invention as an improvement over the admitted prior art above. As such, all of the features in the first paragraphs of these claims read on a published invention disclosed by Konold. Konold discloses a solar collector panel (100, Figure 1) for thermal radiant cooling and for simultaneously converting solar energy to electrical power and thermal energy (column 1, lines 29-31) comprising: a rectangular frame (407, Figure 4) with an open top side (i.e., the side facing the Fresnel Lens, 409, in Figure 4) and a bottom side closed by a bottom plate (bottom cover plate, 405); a photovoltaic grid for converting solar energy transmitted into the collector into electrical energy (PV Grid, 401, Figure 4); a thermal collecting/radiator sheet (copper plate, 403, Figure 4), located on a plane below the photovoltaic grid (as shown in Figure 4), for converting solar energy transmitted into the collector into thermal energy; a copper tubing heat exchanger containing a plurality of interconnected heat collecting copper tubes disposed on a plane below the thermal collecting/radiator sheet (copper tubing heat exchanger, 404, Figure 4) but conductively coupled to the sheet through a thermally conductive material that collects thermal energy from the sheet and imparts that thermal energy in a fluid

disposed within the heat collecting copper tubes (as described in column 2, lines 20-25). Though the bottom plate of Konold is constructed of copper, one with skill in the art would have replaced it with any number of metals with high thermal conductivity including aluminum. Further, Konold discloses a lens assembly ("Frensnel lens assembly" composed of Frensnel lenses, 205, and assembly, 409) in Figures 2 and 4 and describes it in Column 4, lines 12-28. As shown in Figure 4, the lenses are secured via supports (Lens Supports, 411) to the frame (Frame, 407). Konold describes the passive tracking function of the lens assembly in Column 4, lines 20-23. Also Konold discloses a temperature sensor (806)(col.2; lines: 55-61) attached to the photovoltaic grid (201) and (401) with a signaling cable as shown in Figure 8 (col.5; lines: 43-54). The adjustable louvers mounted within the lens supports that provide a means to regulate air flow through the lens supports beneath the Fresnel lenses (col.4; lines: 52-56) provide a capability to control lens surface temperature (col. 4; lines: 63-67 & col.5; lines: 1-7). However, Konold fails to disclose several features of the claim that pertain to the roof attachment. These will be treated in succession below.

Zickell et al. disclose the use of a roofing membrane material made of a fibrous mat (paragraph 0012, first sentence) in order to provide traction, structural integrity and lap sealing capabilities (paragraph 0012) and waterproofing (abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the roofing membrane of Zickell to any layer of a roof-installed panel collector or to the roof portion to which it is attached in order to provide sealing capabilities. This includes providing the roofing membrane of Zickell et al. to the bottom of the solar collector panel

of Konold in order to affix the latter to the roof and simultaneously provide traction, structural integrity and lap sealing capabilities. Further, Zickell et al. teaches that the membrane may contain a first adhesive layer (adhesive surface provided by an adhesive rubberized asphalt layer, paragraph 0012) on its top surface. One of ordinary skill in the art would use this layer to adhesively secure to the bottom plate of solar collector of Konold in order to provide waterproofing.

As to limitations 17, the modified solar collector of Konold are discussed in the context of limitations 17 above, but fails to provide solenoid/control valves and sprinkler head units connected between rows of panels that receive on/off control signals through their connected wiring to facilitate roof cooling capability.

McDonough et al. teach the use of a sprinkler system (sprinkler system, 30 and 31, Figure 4) with sprinkler head units connected between rows of panels to provide additional cooling for the building (Column 2, lines 5-7). It would have been obvious to one skilled in the art at the time of the invention to provide the sprinkler system of McDonough et al. to the modified solar collector of Konold in order to provide additional cooling for the building. McDonough et al., however, fail to disclose that the valves in their sprinkler system are electrically activated solenoid valves.

Marek teaches a water delivery system whose purpose is to cool a building or structure (Figures 1 and 3). As part of said system, Marek teaches the use of a solenoid/control valve (38) controlled through "electronic actuation" (Column 5, line 3) to regulate the flow of water in said system. It would have been obvious to one skilled in the art at the time of the invention to provide the sprinkler system of McDonough et al.

with solenoid activated/control valves of Marek provided to the modified device of Konold in order to provide additional cooling for the building and to provide on/off control signals through the wiring connecting the valves in the usual manner (i.e., through "electronic actuation" as described in Marek, column 5, line 3).

The sprinkler system of Marek provided to the modified device of Konold contains "a sensor detecting an environmental condition, such as roof temperature or sheet wetting, may activate water flow by actuating a solenoid valve" (abstract). Marek describes this sensor (50) that detects temperature explicitly in Column 5 lines 55-65 and its placement in Figure 1. Further, Marek explicitly mentions the controller device (system controller, 54) responsible for sending the signal from the sensor to the solenoid/control valves. The signal from any such temperature sensor would necessarily be analog, unless it were deliberately converted to digital. Finally, although Marek does not teach the placement of such sensors on solar panels, he does teach the use of such sensors on locations of the roof "facing solar radiation" (Column 5, line 63). It would have been obvious to one skilled in the art at the time of the invention to provide these sensors the surfaces of all of the solar panels in the construction of Konold in order to detect an environmental condition, such as roof temperature or sheet wetting, and activate water flow by actuating a valve based on said detected environmental condition.

As to limitations 17(a), Konold discloses mounting screw holes that "allow the fastening of the collector panel frame to a footing" in the anodized aluminum frame (407) for the "fastening of the collector panel frame to a footing or building roof using

standard bolts" (Column 4, lines 44-47). Konold discloses a collector panel /the Fresnel lens (solar concentrator) lens retainer imparts a curvature/orientation adjustment which is provided to allow minor adjustments/ability to capture solar radiation and magnify it onto the solar panel magnify the available insolation regardless of sun position/to clear roof obstructions providing a passive solar tracker capability (col.2; lines: 38-43). However, Konold fails to disclose is that the mounting screw holes contain guide tubes extending the entire depth of the collector panel from the top of the frame through the aluminum bottom plate evenly disposed around each side of the collector frame for securing the panel to the embedment with fasteners.

Nolin et al. disclose such guide tubes (fructoconical portions, 12 and 14) as part of the guide for fasteners (Figure 5). Nolin et al. explain in Column 3, lines 37-41 that when said guide tubes are used with a fastener or screw (5) as shown in Figure 4 they serve "to guide and position the screws." It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the guide tubes of Nolin et al. inside the mounting screw holes of the modified solar collector panel of Konold in order to guide and position the screws. As to the limitation that these tubes run the entire depth of the collector panel from the top of the frame through the aluminum bottom plate, one of sufficient skill in the art would adjust the length of the tubes so that they provide sufficient guidance to said screws. Finally, one of skill in the art would position the mounting screw holes and their associated guide tubes as needed in order to secure the panel to the embedment using screws. This includes evenly disposing said holes and tubes around each side of the collector frame.

As to limitations 17(b), Konold also fails to disclose a separate insulated embedment component with capability for factory prefabrication and designed for installation with standard construction techniques.

Ort discloses an embedment or roof-mount for a solar panel in Figures 1 and 2 (solar collector, 20, mounted as shown and described in column 3, lines 10-20) and shows the various components in the cutaway of Figure 3. Ort further discloses the prefabrication of the solar collectors (col.6; lines: 27-29). Wherein, Ort teaches in Column 1 lines 65-68 and Column 2 lines 1-5 that his embedment is designed to allow solid and tight construction that may be completed "on-site" with facilitates both heat exchange and installation efficiency. As shown in Figure 2, the embedment of Ort contains a bottom layer made from standard building construction material as used for roof or deck sheathing (roof component, 40) with a top surface and an opposed bottom surface as shown and a solid insulation board with a top surface (insulation layer, 56) and an opposed bottom surface as shown in Figure 2. The embedment of Ort further contains a subsequent insulation layer (dark, heat-absorbing mounting material, 60). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the embedment of Ort in order to the solar collector of Konold in order to allow solid and tight construction that may be completed "on-site" with facilitates both heat exchange and installation efficiency.

Ort does not explicitly disclose a separate waterproof, self-sealing, membrane between the bottom layer and the solid insulation board.

As discussed above, one of ordinary skill in the art would provide the membrane of Zickel et al. to the modified device of Konold between the bottom layer of the embedment of Ort (40) and the insulation board in order to affix the latter to the former and simultaneously provide traction, structural integrity and lap sealing capabilities (as Zickel teaches in paragraph 0012). As further described above, the membrane of Zickell et al. may contain an adhesive layer (adhesive surface provided by an adhesive rubberized asphalt layer, paragraph 0012) on its top surface to provide waterproofing (abstract). One of ordinary skill in the art would use this layer to adhesively secure it to the building construction material top surface of Ort (40) and provide waterproofing.

Although Ort does disclose a second layer of insulation to provide thermal insulation (dark, heat-absorbing mounting material, 60) placed above the solid insulation board (56), Ort does not explicitly disclose a lap cement layer (second lap cement layer) (col.2; lines: 57-62) that is positioned between two layers of insulation (i.e., between the solid insulation board and the second layer of insulation).

Grzybowski et al. disclose the use of a cold-applied asphalt lap cement layer (cold-applied asphalt composition, abstract) to seal sections of a roof in a manner that requires minimal waste disposal (Column 3, lines 21-25). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the lap cement layer of Grzybowski et al. as needed in the modified device of Konold in order to seal sections of the embedment while simultaneously decreasing waste disposal. This includes providing said lap cement layer between the two layers of insulation (i.e., between the solid insulation board and the second layer of insulation) provided by Ort in order to in

order to seal sections of the embedment while simultaneously decreasing waste disposal.

Ort fails to disclose that the second layer of insulation (dark, heat-absorbing mounting material, 60) is made of fiberglass and asphalt based sheathing.

Pfeffer discloses a fiberglass mat (Figure 1) for use construction. As Pfeffer explains in Column 4, lines 12-20, one of the best uses of this mat is in the manufacture of asphalt roofing which has the advantages of being fireproof (Column 4, line 17) and using less asphalt than standard roofing (Column 4, lines 18-20). It would have been obvious to one of ordinary skill in the art at the time of the invention to provide insulated asphalt roofing using fiberglass mat of Pfeffer as a replacement for the second layer of insulation in the embedment of Ort provided in the modified device of Konold in order to make the embedment fireproof while using less asphalt than standard roofing.

In regard to clam 17(c), the embedment provided by Ort in the modified device of Konold does not contain a lap cement layer (first lap cement layer) in contact with the second layer of insulation because Ort does not explicitly disclose such a layer.

As mentioned above, Grzybowski et al. teach the use of a lap cement layer (cold-applied asphalt composition, abstract) to seal sections of a roof in a manner that requires minimal waste disposal in Column 3, lines 21-25. It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the lap cement layer of Grzybowski et al. as needed in the modified device of Konold in order to seal sections of the embedment while simultaneously decreasing waste disposal. This includes providing the lap cement layer of Grzybowski et al. between the second layer

of insulation in the embedment provided by Ort and the adhesive layer of and roofing membrane of Zickell.

As to limitations 17(d), pipe/tubing in the fluid transmission system joined to the collector panels that is part of the solar collector system of Konold (col.5; lines: 55-58) and Ort further discloses the prefabrication of the solar collectors (col.6; lines: 27-29). However, Konold fails to disclose is the use of a fluid containing pipe with a plurality of outlets terminated in a quick disconnect fittings, whereby fluids are distributed to and collected from solar panels connected to the outlets by quick disconnect fittings attached to each solar panel.

Corbett et al. teach the use of quick connect/disconnect fittings of a pipe/tube in a fluid and vapor transmission system (Column 1, lines 10-20) in order to allow rapid connection and disconnection from the pipe/tube in a fluid transmission system (Column 1, lines 57-63 & Column 3, lines 65-68). It would have been obvious to one skilled in the art at the time of the invention to use the quick disconnect fittings of Corbett et al. along with the copper tubing/pipe of Konold to attached to the liquid inlet and outlet of each panel. It would have also been obvious to one skilled in the art at the time of the invention to use the quick connect fittings of Corbett et al. along with the tubing/liquied containing pipe of Konold to provide pipe liquid connection manifolds for liquid distribution to and collection from panels arrays that are connected to the manifold by the copper quick connect fittings.

As to limitations 17(e), the combination of Konold, Ort, and Corbett discussed in the context of limitations 17(d) and further discloses the integration of solar panels

interconnected in plurality of configurations to a power receiving apparatus (Figures 5 and 6) (col.6; lines: 22-30), Ort further discloses the prefabrication of the solar collectors (col.6; lines: 27-29), and Corbett discloses a water tight snap on fitting to protect against leakage (col.4; lines: 26-33), but fails to disclose enclosed wiring distribution scheme that includes a raceway with water tight quick disconnect snap on receptacles and plugs integrated within the raceway.

Ewer et al. disclose a plastic raceway (depicted in Figures 1 and 7) as a means to hold and manage electrical wires while keeping them hidden from view. It would have been obvious to one skilled in the art at the time of the invention to use plastic raceways of Ewer et al. along with the embedment provided by Ort and Corbett to the modified device of Konold in order to hold and manage electrical wires while keeping them hidden from view. Such a system of raceways would be used to receive all electrical wiring from each panel or series panel of Konold arranged in an array.

Furthermore for limitations 17(e), the combination of Konold, Ort, and Corbett discussed in the context of limitations 17(d) above, but fails to provide quick-disconnect snap-on receptacles and plugs.

Kirby discloses an electrical connector assembly that uses a "snap-in connector concept" (Column 1, lines 10-12) in order to "provide a disconnect means for mounting" of a socket (Column 1, lines 24-27). It would have been obvious to one skilled in the art at the time of the invention to provide the electrical assembly of Kirby along with the embedment of Ort in order to provide electrical interconnection of panels with a "quick-connect and disconnect means for mounting." Further, one skilled in the art would

provide the electrical assembly of Kirby along with the embedment of Ort to connect panels or series strings of panels of modified Konold to the raceway of Ewer et al. again in order to provide a "quick-connect and disconnect means for mounting."

As to limitations 17(f), the combination of Konold and Ort discussed in the context of limitations 9(d) above, and Konold further discloses a storage tank for water storage (801), liquid pressurization, check valves (803), filter (806), (col.6; lines: 43-55) and connectionfittings/conduit elbow fitting (402) as shown in Figure 8. Konold further discloses tubes/piping (col.1; lines: 54-60) and connection to connect to the apparatus to a building water distribution system (col.3; lines: 60-65).However, Konold fails to disclose a rain runoff collection trough connected to the lowest end of a slanted roof mounted solar panel or array of solar panels.

McDonough et al. disclose a modular roof covering system (Figures 1 – 4) that can manage store water runoff and collect and utilize solar energy (column 1, lines 39-45). McDonough et al. comprise teaches a rain runoff collection trough (troughs and ridges, 11 and 12, shown in Figure 1) to prevent saturation damage to the roof layers below from the weight of accumulated water (Column 4, lines 30-35). As McDonough et al. further explain in column 4, lines 24-27, the ridges (12) may have depressions (18) with holes (14) to allow excess water to drain out of the tray. It would have been obvious to one skilled in the art at the time of the invention to provide the rain runoff collection trough of McDonough et al. to the embedment of Ort provided to the modified device of Konold in order to prevent saturation damage to the roof layers below from the weight of accumulated water.

With respect to claim 17(g), Konold discloses in Figure 2 an improve heat exchanger consisting of copper tubing with copper liquid storage tank/water tank (col. 3; lines: 59-64). As for aluminum tubing with an aluminum water tank, the two materials are functional and mechanical equivalents. *Smith v. Hayashi*, 209 USPQ 754 (Bd. of Pat. Inter. 1980) (see MPEP 2144.06).

As detailed above, the combination of Konold and Zickell et al., Nolin et al., Ort, Grzybowski et al., Pfeffer, Corbett et al., Ewer et al., Kirby, McDonough et al., and Marek reads on the invention of claim 17.

As detailed above, the combination of Konold and Zickell et al., Nolin et al., Ort, Grzybowski et al., Pfeffer, Corbett et al., Ewer et al., Kirby, McDonough et al., and Marek reads on the invention of claims 17.

Response to Arguments

Claim Rejection under 35 USC 103

7. With respect to claims 1, 9, and 17, the Applicant argues that the fact that a large number of references must be combined in an attempt to meet the SYSTEM is evidence of unobviousness. The Examiner respectfully disagrees. In response to applicant's argument that the examiner has combined an excessive number of references, reliance on a large number of references in a rejection does not, without more, weigh against the obviousness of the claimed invention. See *In re Gorman*, 933 F.2d 982, 18 USPQ2d 1885 (Fed. Cir. 1991).

8. In regard to claims 1, 9, and 17, the applicant argues that some of the prior references are many years older and id not anticipate the combined suggestion. The

Examiner respectfully disagrees. In response to applicant's argument based upon the age of the references, contentions that the reference patents are old are not impressive absent a showing that the art tried and failed to solve the same problem notwithstanding its presumed knowledge of the references. See *In re Wright*, 569 F.2d 1124, 193 USPQ 332 (CCPA 1977).

9. With respect to claims 1, 9, and 17, the Applicant argues that it is not obvious to invert this membrane material made of fibrous mat and secure it to the bottom of the solar collector of Konold since the reference teaches away from that application. It mentions in numerous paragraphs that the matt is adhesively secured to a roofing deck via the adhesive layer. The Examiner respectfully disagrees. Zickell et al. disclose the use of a roofing membrane material made of a fibrous mat (paragraph 12, first sentence) in order to provide for waterproofing, this solves the problem of protecting Konold's solar panel placed on a roofing membrane in various weather conditions. Konold discloses a solar collector panel (100, Figure 1) for thermal radiant cooling and for simultaneously converting solar energy to electrical power and thermal energy (column 1, lines 29-31) to be placed on a roof membrane (col. 2; lines: 1-5), and to improve the electricity conversion in various weather conditions (col.1; lines: 33-36).

10. In response to applicant's argument the guide for aligning screw used for fastening as disclosed by Nolin et al. is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re*

Oetiker, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, the particular problem of providing mounting screw guides to fasten the modified solar panel Konold to the frame through the aluminum bottom plate, Nolin et al. solves the problem by teaching that guide tubes are used with fasteners or screws to serve to guide and secure the position of the screws (col.3; lines: 37-41).

11. With respect to claims 1, 9, and 17, the Applicant argues that the Examiner is incorrect in referring to the insulation of Ort as a solid insulation board. The Examiner respectfully disagrees. The Insulation board as disclosed by the Applicant in the claim language is interpreted as an insulation layer since they both serve to insulate. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the insulating materials have little compression strength and must be environmentally and mechanically protected by a surrounding structure) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

12. With respect to claims 1, 9, and 17, the Applicant argues that Pfeffer and Ort are nonanalogous art to the Konold application, the combination of the Pfeffer fiberglass mats, the embedment of Ort and the lap cement layer of Grzybowski is not analogous to the embedment of this application. In response to applicant's argument that the combination of the Pfeffer fiberglass mats, the embedment of Ort and the lap cement

layer of Grzybowski is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, the problem of Konold needs a sealant and weather protectant for the solar collector is solved by the teaches of Grzybowski, wherein Grzybowski seals the section of a roof with lap cement layer (col.3; lines: 21-25). Ort and Pfeffer solves the applicant's problem by providing an insulation material, which is also fireproof/heat resistant (Ort, col.2; lines: 57-62) & (Pfeffer, col.4; lines: 12-20).

13. With respect to claims 1, 9, and 17, in response to applicant's argument that Applicant argues that Kirby teaches this design is only for mounting a socket to a chassis and is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Kirby teaches the snap-in connector for both disconnecting and connection means (col.1; lines: 10-12 & 24-27). Konold discloses pipe/tubing in the fluid transmission system joined (deficient in a connector or disconnecting means) to the collector panels that is part of the solar collector system (col.5; lines: 55-58). Kirby discloses an electrical connector assembly that uses a "snap-in connector concept" (Column 1, lines 10-12) in order to "provide a disconnect means

for mounting" of a socket (Column 1, lines 24-27). Kirby solves the problem of modified solar collector of Konold.

Conclusion

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Asha Hall whose telephone number is 571-272-9812. The examiner can normally be reached on Monday-Thursday 8:30-7:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AJH

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SUPERVISORY PATENT EXAMINER